



INSECTS OF SAMOA

PART V. FASC. 1

HYMENOPTERA

APOIDEA, SPHECOIDEA,* AND VESPOIDEA

BY R. C. L. PERKINS, D.Sc., F.R.S.
AND L. EVELYN CHEESMAN, F.E.S., F.Z.S.

(With 12 Text-figures.)

I. INTRODUCTORY REMARKS.

THE bees and wasps of Samoa, as at present known, are few in number, so that, excluding the hive bee but including some distinct races of species known elsewhere, we are able to list below only thirteen forms of Apoidea, four of Vespoidea, and nine of Sphecoidea. Of the latter the three species of Larridae have been studied and the new species described by Dr. F. X. Williams of Honolulu (p. 33 below). The pretty little bee that we have called *Echthralictus latro* may prove to be identical with Cockerell's previously and very briefly described *Halictus stevensoni*.

It is quite probable that a considerable number of the species listed do not belong to the natural fauna of Samoa, but are accidental importations due to human agency. As is well known, *Lithurgus scabrosus*, *Pison hospes*, *P. iridipennis* and *P. argentatum*, as well as *Polistes macaensis*, have all been brought to the more isolated Hawaiian group since its occupation by white men, and any of these, as well as some others not known in Hawaii, may quite as easily have been similarly imported into Samoa. With regard to *Lithurgus bractipes* we cannot overlook the possibility of a mistaken locality, since it is not included in the Buxton and Hopkins collection, nor was it found by the Hawaiian

* The Larridae are dealt with by Dr. F. X. Williams, pp. 33-39 below.

collectors, Swezey and Bryan, during their visits, in spite of their great experience of island collecting.

The *calens* race of *Megachile diligens*, found on Tutuila, occurs also in Fiji and the Ellice Is., and superficially is very distinct from the typical Hawaiian bee, but the race *armstrongi* of Upolu differs very little from the latter; while the race *buxtoni*, of Manono, is closely allied to *calens*. *M. scutellata wilmattae*, of Upolu, and *M. scutellata tutuilae*, of Tutuila, are distinguishable with ease one from the other, and also from the typical *scutellata* of Tonga and Fiji, by characters of pubescence, but owing to the identity of the extremely important ♂ characters of the concealed 5th and 6th sternites and of the genital armature itself, as well as of other more superficial structures, we prefer to consider the Samoan forms as local races or subspecies of *scutellata*.

By far the most important part of the bee fauna is the series of half a dozen species of Halictines, none of which is at present known to occur elsewhere, though one (*H. perpessicius* Kohl) was supposed by its describer to be found also in Fiji and is included by Turner in his Fijian list. All the specimens of Fijian *Halictus* that we have seen, however, are quite distinct from the Samoan species.

Two of the Samoan species not only differ conspicuously one from the other in important structures, but also present such remarkable characters, as compared with other Halictines, that we have considered them to be parasitic on the other species, though, of course, special observations should be made in the field to confirm this. Whether similar and apparently parasitic forms of *Halictus* are known in other countries is uncertain, but it is probable that such exist in Australia, since one of us remembers having collected an anomalous Halictine there, which may have been allied to Kohl's *H. extraordinarius*. Unfortunately only the ♂ of this Australian bee was collected, and at the time of writing it cannot be found for comparison.

In Hawaii some of the long series of species of endemic Hylaeid bees are known to be parasitic in the nests of others, and have become modified in structure accordingly, though, owing to the slight development of special polliniferous organs in this family, the modification is comparatively small. The Samoan Halictines, on the other hand, belong to a group that is beautifully endowed with highly specialised arrangements for collecting pollen, and the supposed parasitic species consequently present a great contrast to these. They have, in fact, become modified to such an extent that we have made a

new genus for their reception. At present it is doubtful whether this genus, *Echthralictus*, is endemic and derived from Samoan species of *Halictus* proper, or whether at some future time it will not be found elsewhere, but the latter view is more probably correct.

Judge P. Blüthgen, in his recent work on Indo-Malayan *Halictus*, has characterised several allied groups with great care and detail, referring also incidentally to some of the Australian species and to the Samoan *H. perpessicius*. How far these groups will prove separable when the very numerous Australian species together with those of the Pacific Is. have been studied with the same care and acumen, appears uncertain, but, considering the general resemblance of Samoan species of *Halictus* to those of Fiji and Tonga, and the similarity of these in many characters to the group of "*Halicti striaticipites*," we think that all may at present be best placed in that group. The armature of the calcar of the hind tibiae of the ♀, the bare dark stripes along the lower orbits, the striation of the head behind the ocelli and at the sides behind the eyes, and especially the specialised polliniferous clothing of the abdominal sternites and pleurites appear to us more important than differences in the shape of the head, such differences being great in the case of the closely allied Samoan species themselves. It is true these have not the distinct longitudinal striation of the frons, but such sculpture is well seen in *H. fijiensis* and *H. tonganus*, which, from their general structure and from the form of the ♂ genitalia, appear to be closely allied to the Samoan species. On account of their interest and importance we have discussed these Halictines at some length, and it is probable that they will prove of still greater interest when the Australian species have been more thoroughly collected and more minutely studied.

Among the Fossorial Hymenoptera, *Pison glabrum* is apparently not yet known elsewhere, but the other four species are more or less widely distributed in the South Pacific, and some extend their range to Australia or even further. They are easily introduced into new countries through man's agency. The single species of *Psen* (*Mimesa*) may be endemic; it lacks the highly specialised characters of the Hawaiian forms. Of the Larridae, two species are described as new by Dr. Williams (pp. 33 to 39 below), but *Notogonidea retiaria* is known to occur in Fiji and Australia.

All the Vespidae are species of wide distribution in the Pacific Is., or are even more widely distributed, and all are species which may easily have been carried by man from one group to another. On the other hand, the single

species of *Anoplius* (Psammocharidae), though of conspicuous appearance, is not known to have been met with in any other country.

It is clear that the Aculeate fauna of Samoa is in general of a similar nature to that of Fiji; each contains a number of species either of wide distribution in the Islands of the South Pacific or of still wider distribution, and a small—one must say a disappointingly small—number of endemic forms. When one thinks of the large number of remarkable endemic bees and wasps of Hawaii, the fauna of Samoa and Fiji seems very poor indeed in these groups, but ants, which, except as introductions by man, have hardly reached Hawaii, are more richly represented. The ancestors of the present Hawaiian bees and wasps must have reached that group at a period vastly earlier than that at which the present Samoan and Fijian fauna of these insects originated. This is shown not only by the number and variety of species that have been evolved in Hawaii and adapted to fill many different stations and conditions, but also by the peculiarity or high specialisation of many of the species.

Only in one respect do the faunas—so far as the bees and wasps are concerned—of Hawaii and Samoa resemble one another, namely in the very small number of types that have gained access to the islands, or at any rate that have been able to establish themselves. Such types all belong to—or are modified from—genera which are widely distributed over the world. Samoa and Fiji both offer a considerable diversity of environment, and one might suppose that under natural conditions they would after a great lapse of time become possessed of a fauna of bees and wasps of the same general character as the Hawaiian; at present, however, only the very earliest stage has been reached.

II. DISTRIBUTIONAL LIST OF SAMOAN BEES AND WASPS.

APOIDEA.

APIDAE.

1. *Apis mellifera* L.

Samoa : Upolu, Tutuila.

MEGACHILIDAE.

2A. *Megachile diligens* Sm., sub-sp. *armstrongi*, nov.

Samoa : Upolu.

2B. *M. diligens* Sm., sub-sp. *calens* Cock.

Samoa : Tutuila ; Fiji ; Ellice Is.

2c. *M. diligens* Sm., sub-sp. *buxtoni*, nov.

Samoa : Manono.

3A. *M. scutellata* Sm., sub-sp. *wilmattae* Cock.

Samoa : Upolu.

3B. *M. scutellata* Sm., sub-sp. *tutuila*, nov.

Samoa : Tutuila.

The typical form of *M. scutellata* is found in Fiji and Tonga.

4. *Lithurgus scabrosus* Sm.

Samoa, Fiji, Rarotonga, Marquesas Is., Society Is., New Hebrides, Hawaiian Is. (introduced about 30 years ago), Tonkin.

5. *L. bractipes*, sp. nov.

Samoa.

ANDRENIDAE.

6. *Halictus perpessicius* Kohl.

Samoa : Upolu, Savaii, Tutuila.

7. *H. upoluensis*, sp. nov.

Samoa : Upolu.

(Var. *savaiiensis*, nov. and var. *tutuila*, nov. on Savaii and Tutuila.)

8. *H. samoae*, sp. nov.

Samoa : Upolu.

9. (?) *H. stevensoni* Cock.

Samoa : Upolu.

[*H. tonganus*, sp. nov., of Tonga, and the Fijian *H. fijiensis* and *H. versifrons*, spp. nov., are more or less closely allied to the Samoan species.]

10. *Echthralictus latro*, sp. nov.

Samoa : Upolu, Savaii.

11. *E. extraordinarius* Kohl.

Samoa : Upolu.

SPHECOIDEA.

LARRIDAE.*

Notogonidea retiaria Turner.

Samoa : Upolu and Tutuila ; Fiji ; Australia.

Notogonidea samoensis Williams.

Samoa : Upolu, Tutuila, Savaii.

* See Williams' paper, pp. 33-39 below.

Liris samoensis Williams.

Samoa : Upolu, Tutuila.

TRYPOXYLONIDAE.

12. *Pison glabrum* Kohl.

Samoa : Upolu and Savaii.

13. *P. tahitense* Sauss.

Samoa : Upolu, Tutuila, Savaii ; Fiji ; Ellice Is. ; Marquesas Is. ; Society Is.

14. *P. hospes*, Sm.

Samoa : Upolu, Tutuila ; Ellice Is. ; Fiji ; Tonga ; Marquesas Is. ; Hawaiian Is. ; Keeling ; Singapore.

15. *P. argentatum* Sh., sub-sp. *ignavum* Turn.

Samoa ; Fiji ; Australia.

16. *P. iridipennis* Sm.

Samoa : Upolu, Tutuila ; Fiji ; Society Is. ; Bolabola ; Tuamotu Arch. ; Marquesas Is. ; Hawaiian Is. ; Australia.

MIMESIDAE.

17. *Psen bryani*, sp. nov.

Samoa : Savaii, Tutuila.

VESPOIDEA.

VESPIDAE.

18. *Polistes macaënsis* Fab.

Samoa ; Fiji ; Marquesas Is. ; Society Is. ; Hervey Is. ; Rarotonga ; Is. (introduced 40–50 years ago) ; Seychelles ; Baghdad ; China.

19. *Odynerus (Rhynchium) rufipes* F.

Samoa ; Fiji ; Ellice Is. ; Society Is. ; Tonga ; Marquesas Is. ; Loo Choo Is.

20. *Odynerus (Leionotus) bicinctus* F.

Samoa ; Ellice Is. ; Marquesas Is. ; Society Is. ; Rarotonga.

POMPIDAE.

21. *Anoplius spirohirtus*, sp. nov.

Samoa : Savaii.

III. SYSTEMATIC PART.

APOIDEA.

APIDAE.

1. *Apis mellifera* L.

A series from Upolu and Tutuila, collected at various dates from 1922.

MEGACHILIDAE.

Megachile.

There are two distinct—but not endemic—species of *Megachile* on the Samoan Is.; each of these on different islands of that group (as well as on other groups of islands) has become divided up into distinct sub-species. We treat as sub-species all forms which, so far as we can see, present no important differences one from the other in external structures, and appear to be identical in the remarkable characters exhibited by the hidden abdominal sternites of segments 5–8 of the ♂, as well as in the genital armature of this sex, but which differ constantly in characters afforded by the colour of the pubescence, etc.

2. *Megachile diligens* Sm. (Text-fig. 1, A and B.)

Megachile diligens Sm. is represented by three distinct sub-species, *armstrongi*, sub-sp. n. on Upolu, *calens* Ckll. on Tutuila, and *buxtoni*, sub-sp. n. on Monono. In *armstrongi* and *calens*, the extremely peculiar hidden apical sternites of the ♂ genitalia (Text-fig. 1, A) entirely agree with typical *diligens* Sm. from the Hawaiian Is.

2A. *Megachile diligens* Sm., sub-sp. *armstrongi*, nov.

Differs from the typical form in the colour of the general covering of the 4th and 5th tergite in both sexes, which consists of very short dark hairs in the Samoan species, and of rather longer, clear yellow hairs in that of Hawaii.

Upolu: Vailuietai, 4 ♂♂, 1 ♀, 2.iii.1923 (J. S. Armstrong); 2 ♀♀, 4.vi.1924 (Buxton and Hopkins).

2B. *Megachile diligens* Sm., sub-sp. *calens* Ckll.

Cockerell, *Ann. Iraq. Nat. Hist.*, xiv, p. 464, 1914 (*M. calens* Ckll., syn. *M. vavauensis* Ckll., *Ann. Ent. Soc. Amer.*, 17, p. 393, 1924).

This is a darker race of *M. diligens*, with dark hairs distributed generally among the clothing. It is thought advisable to supplement Cockerell's descrip-

tion of *M. calens* with the following characters, in which this subspecies differs from the typical form.

♀. Hair of the face deep cream mixed with black; sparse on the disc of the clypeus. Legs dark brown.

♂. Hair on the disc of the mesonotum and scutellum black. 5th tergite covered with short, decumbent, and long sub-erect red-orange hair, except for a broad triangular fascia of black hair in the centre. 6th tergite covered with red-orange decumbent and sub-erect red-orange hair, except for the fovea and the apical margin. Apical angles slightly more produced than in *M. diligens* Sm.

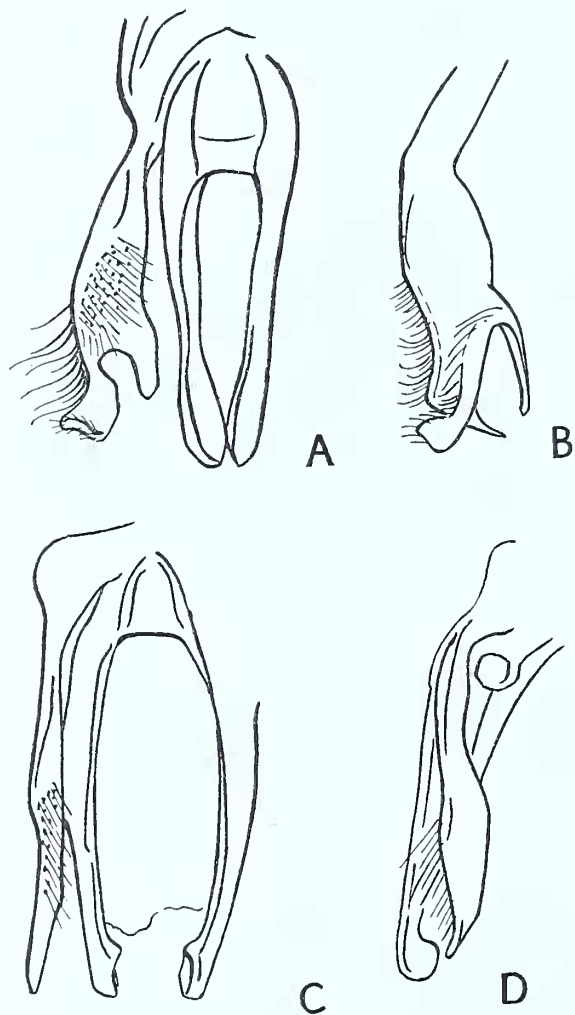
Tutuila, 1 ♂, 10.i.1923 (Swezey and Wilder).

2c. *Megachile diligens* Sm., sub-sp. *buxtoni*, sub-sp. n.

Closely allied to sub-sp. *calens*, but differing in the following characters:

♂. Hair band of 4th tergite

entire. 5th tergite covered with short, decumbent, and long, sub-erect red-orange



TEXT-FIG. 1.—Genitalia of *Megachile*, spp. ♂.

M. diligens Sm.

M. scutellata Sm.

A, dorsal view.

C, dorsal view.

B, profile (stipes).

D, profile (stipes).

hair, except for a narrow longitudinal median line of decumbent black hair with a few sub-erect dusky-brown hairs (not clearly yellow as in *M. diligens* Sm.).

Manono, 1 ♂, 10.vi.1924 (Buxton and Hopkins).

3A. *Megachile scutellata* Sm., sub-sp. *wilmattae* Cock. (Text-fig. 1, C and D.)

Cockerell, *Ann. Ent. Soc. Amer.*, 17, p. 392, 1924 (Samoa : Apia).

To Cockerell's description of this sub-species it appears advisable to add the following characters and emendations :

Hair of the face pale yellow, that on the vertex and disc of the mesonotum and of the scutellum black ; under side of the head, as also mesopleurae and coxae, clothed with pale cream hair, which also forms tufts on the pronotum and in the metathoracic-scutellar suture. Abdominal hair-bands entire but of fine hair, much less dense in the centre, and widening into wedge-shaped fasciae at the sides, bright yellow-orange.

♂. Scattered hairs on the 4th tergite ; dense, decumbent hair on the 5th tergite, and sparse decumbent hair on the 6th tergite yellow-orange, mixed with erect black hair on the 6th tergite. Apex of the 6th tergite more narrowed than in *M. scutellata*.

In the ♂ armature like *M. scutellata*, but differing in the colour of the clothing, and in the abdominal hair bands, which are more dilated at the sides of the segments.

Upolu, 3 ♂♂, 1 ♀, 9.vii., 1.x.1923 (Armstrong) ; 5 ♂♂, 2 ♀♀, ii.-xi.1924 (Buxton and Hopkins) ; 1 ♂, 1♀, 3.ix.1917 (Swale, Coll. B.M.).

3B. *Megachile scutellata* Sm., sub-sp. *tutuila*, nov.

In the ♂ armature like *M. scutellata*, but differing in the following characters :

♀ Punctuation of the disc of the clypeus rather coarser and more irregular, that of the mesonotum and scutellum coarser and sparser. Hair of the face creamy white as in *M. scutellata*, but with no black hair mixed with it on the lower part of the face. Abdominal hair bands bright orange, interrupted in the middle. No band on the 1st tergite ; wedge-shaped fasciae at the sides of the 2nd, 3rd, and 4th tergites ; scopa orange, with black hair on the two apical sternites. Sparse short black hair on the discs of all the tergites.

♂ as in ♀ ; 6th tergite without any orange hair but covered with sparse black hair ; apical margin narrowed, lateral angles wide and not produced. Very short sub-erect black hair on all the tergites.

Tutuila, 8 ♂♂, 3 ♀♀, 9, 23.ix.1923 (Swezey and Wilder) ; 1 ♂, 1♀, 14.xii.1925.

4. *Lithurgus scabrosus* Sm.

Smith, *Journ. Proc. Linn. Soc. Zool.*, iii, p. 134, 1858, No. 2, ♀ (Aru Is.) (Syn. *L. albofimbriatus*, Sichel, *Reise Novara Zool.*, ii, pt. 1, p. 154, 1867 (Tahiti).

Type in Saunders Coll., the Hope Museum, Oxford. We have compared this with specimens from Samoa; it also agrees with specimens from Fiji, Rarotonga, Society Is., Marquesas Is., and Honolulu. In 1908 Kohl (*Denk. K. Akad. Wiss. Wien., Math-Naturw. Kl.*, Bd. 81, p. 308) compared specimens from Samoa with Sichel's type, which is in the Hof Museum, Vienna.

Upolu, 1 ♀, 1913 (Doane); 6 ♀♀, i.-xii.1924 (Buxton and Hopkins); 8 ♀♀, v., vi., x.1924 (Armstrong); Tutuila, Pago Pago, 1 ♀, 4.xi.1925.

5. *Lithurgus bractipes*, sp. n. (Text-fig. 2, A.)

♂. Hair of the face grey, on the apical margin of the clypeus brown, on the vertex fuscous brown. Frons coarsely reticulate punctate; clypeal



TEXT-FIG. 2.—A, Posterior tarsus of *Lithurgus (Megachile) bractipes* Perkins and Cheesman, sp. n.; B, Posterior tarsus of *L. (M.) atratiformis* Sm.

prominence with a median carina running back from the centre between the antennae, but not reaching the fore ocellus. Mandibles black, shining, tridentate. Vertex shining, with coarse, rather dense punctures.

Disc of mesonotum and scutellum with short, black hair; mesopleurae covered with long, grey hair. The mesonotum obscurely transversely rugose, with indistinct ridges—not scabrous. Scutellum with a median impression; dorsal area of median segment with a very slight impression in the centre.

Abdominal tergites covered with extremely short, decumbent, black hair, longer at the sides, with narrow fasciae of sparse grey hair at the lateral angles; 5th and 6th tergites covered with long black hair, with a fringe of short grey hair on the apical margins. Scopula-like hair on the ventral side black.

Legs dark brown, tarsi with golden-brown pilosity on the apex of each segment. 1st pair of claws long, black at the apex. Hind tibiae stout and very

long, slightly curved, upper side rugose. Basal segment of the tarsus flattened on the inner side, and produced at the apex into a sheath-like plate, squarer in form than that of *L. atratiformis* Sm., which it closely resembles (Text-fig. 2).

One ♂ (B.M.) from Samoa, 1875 (Rev. S. J. Whitmee). Allied to *L. atratiformis* Sm., but differing in the form of the median segment, scutellum, and tarsal sheath, also in the length of the hind tibiae, and the colour of the pilosity.

KEY TO MEGACHILINE BEES OF SAMOA.

A. Head and mesonotum dull, with shallow, fine, and dense punctures. Scutellum normal. ♂ front tarsi sub-dilated, 2nd segment scarcely longer than wide. Front coxae with large prominent spine or process. Venter normal in clothing. Stipites of genitalia terminating in three processes, of which two only are visible in dorsal aspect (Text-fig. 1, A, B). ♀ 6th tergite fairly evenly clothed with sub-decumbent hair. 2nd sternite normal.

Group of *diligens* Sm.

♂. 4th tergite clothed with abundant, golden, sub-erect hairs; 5th tergite very densely clothed with decumbent, tomentose hairs as far as basal articulation. ♀ abdominal fasciae entire and well developed.

diligens Sm. (Hawaii).

a. Dark short hair on general surface of 4th tergite in ♂, and on the 4th and 5th tergites in ♀.

diligens Sm., sub-sp. *armstrongi*.

b. ♂. 4th tergite clothed with dark hair except for apical fascia, which is sometimes interrupted; black hairs scattered among rest of clothing give whole insect a darker appearance. ♀ fasciae indistinct; dorsal bands represented by sparse, short hairs.

diligens, sub-sp. *calens* Ckll.

c. ♂. Apical red-orange fasciae of 4th tergite entire, 5th tergite almost completely clothed with tomentum, only a very narrow median area dark; erect hairs pale coloured.

diligens, sub-sp. *buxtoni*, sub-sp. n.

B. Head and mesonotum shining, remotely punctured. Scutellum conical. ♂ front tarsi slender; 2nd segment longer than wide. Front coxae with at most a slight tubercle. Venter with very dense, scopa-like clothing on

3rd, 4th, and apex of 2nd segments except in centre. 2nd segment very strongly convexly raised. Stipites simple at apex (Text-fig. 1, C, D). ♀ 6th tergite without clothing of hair, at most with sparse hair basally or at sides. 2nd ventral segment very strongly raised from base, forming a rounded median tubercle.

Group of *Scutellata* Sm.

a. ♂ dorsal fasciae dirty white, sparse laterally and interrupted. 6th tergite very densely covered to apical margin with decumbent red-orange hair, mixed with a few erect, black hairs. ♀ dorsal fasciae narrow, entire, slightly wider laterally. Scopa red-orange, on the two apical segments black.

scutellata Sm.

b. ♂ tergites with very definite wedge-shaped lateral spots of red-orange hair on apical margins, not forming complete fasciae. 6th tergite covered with long, dark hair basally. ♀ scopa red-orange; wedge-shaped lateral spots very definite, cilia connecting them along apical margins very short and sparse, scarcely close enough to form definite fasciae.

scutellata Sm., sub-sp. *tutuila*e, sub-sp. n.

c. Wedge-shaped lateral spots of tergites yellow, continuing on apical margin to form complete fasciae. ♂ 5th tergite entirely covered with long, sub-erect yellow hair. 6th tergite with yellow hair at base, sparse, and mixed with erect black hairs. ♀ scopa yellow, black on apical segment.

scutellata, sub-sp. *wilmattae* Ckll.

ANDRENIDAE (HALICTINAE).

All the Samoan Halictines are to a large extent metallic, and all have the following characters. The front of the head under a strong lens appears minutely granulated; under a compound microscope the sculpture is seen to be reticulated, and the punctures are for the most part sparse and feebly impressed, sometimes hardly visible amongst the rugulose reticulation of the surface. There is no distinct longitudinal striation of the face, such as can be seen with a strong lens in many Australian, Fijian, and Australasian species. Seen from above, the head is narrowed behind the eyes, and a transverse striation is always evident, and is continued on the sides of the head behind the eyes, where it is longitudinal in direction.

The pronotal lateral angles are always distinct, often prominent or very conspicuously produced. The mesonotum has a microscopic reticulation, and the punctures are very fine and sometimes, especially in some ♂♂, hardly evident amongst the surface sculpture, even under a strong lens. The anterior area of the propodeum is never defined by a raised margin, and is always conspicuously though not coarsely rugose; the wrinkles are often mainly longitudinal, more or less obliquely so on either side of a straight median one; frequently there is a certain or even a considerable amount of reticulation, and on the apical portion of the area there is sometimes notable transverse rugosity, which more rarely occupies a large part of the middle of the area also. In *H. perpessicius*, of which we have examined very large numbers, we have observed great variation in the sculpture of this area, but of other species the available material is too limited to afford any satisfactory information on this matter. The lateral areas are likewise undefined by any raised margin, and have a fine microscopic sculpture and sometimes also a distinct fine striation; it may be that the fine ends of the longitudinal wrinkles of the anterior area are continued on to them. The posterior area is almost smooth, except for microscopic sculpture, and its lateral margins are either defined by a raised line at their lower end only, or else this extends up as far as the hind end of the lateral area. The sculpture of the abdomen consists of extremely fine, close, regularly transverse rugulosity or striation, over practically the whole dorsal surface, and can be quite readily seen under a very strong lens. The apical impressions of the tergites are quite definite, and are without any punctures, though feeble, ill-defined ones are visible at any rate on the third and following segments in the ♀, and on some at least of the more apical ones of the ♂, except on the impressions themselves. In the ♂, the bases of the 2nd and 3rd tergites are more or less impressed transversely, and the apical and lateral edges of the 7th are sharp or carinate, forming a wide sort of "pygidial area." The single calcar of the hind tibiae in this sex also bears distinct outstanding teeth, as does that of the ♀. The number of teeth on the spur is normally four, and these decrease in length from the basal to the apical one, but specimens with the teeth aberrant in number and form occur, as in some species found in other countries.

The species possessing the above characters represent two quite distinct groups. One of these consists of *H. perpessicius* Kohl and its allies, which are very similar to some of the Australian, Fijian, and other island species, although the latter evidently have striated faces. The other is represented by

H. extraordinarius Kohl, and another very different species, which are better separated from the genus, since they are probably parasitic in the nests of the others. They are at least as different from *Halictus* proper as is *Psithyrus* from *Bombus*. Since they are very probably derived from the group to which *H. perpessicius* belongs, as is evidenced by the large number of characters (given above) common to all the Samoan species, these presumably parasitic species may be best characterised by comparison with the others.

Halictus perpessicius group (♀).

Head not very wide and incrassate, the temples not large. Mandibles ordinary; labrum with the appendage so compressed as to be narrow or sub-spiniform. Clypeus ordinary in form, more or less strongly punctate on the apical portion, which is quite different in colour from the basal. Glabrous dark spaces along the lower orbits very distinct and conspicuous, reaching to, or almost to, the line of the antennae, and overhung by fringe of hairs. Front tarsi normal, the intermediate joints having on their dorsal surface the usual fringe of long and specially curved hairs on either side. Hind femora with the usual Halictine pollen basket of long and beautifully plumose hairs. Ventral scopa of extremely long plumose hairs on abdominal sternites 1-4, still denser on the pleurites of these segments. Fifth tergite with sculptured *rima*, well fringed with appressed hairs (Text-fig. 3).

Echthralictus, gen. nov. ♀.

Head very wide, the face strongly transverse (Text-fig. 5), temples large. Clypeus very wide, flattened or impressed over most of its surface; *mandibles* * *either long and simply pointed, but very strongly bent or subgeniculate, or with a long dilatation on the inner edge forming a very wide and rounded tooth or lobe occupying the middle part of this edge.* The two well separated labral tubercles shining and very prominent, *the appendix of the labrum large and triangular, not greatly compressed or spine-like,* but somewhat reminiscent of this part in some species of *Sphcodes*, though more pointed at the apex. Glabrous spaces along the lower orbits not or hardly present. *Front tarsi without the normal, curved, sweeping hairs, these being straightish and setose on either side of the intermediate*

* The italicised characters are those of importance in relation to *Halictus* as a whole, not merely to the *H. perpessicius* group.

joints (Text-fig. 6). The hairs on the hind trochanter and base of femur moderately long, but not forming a floccus (Text-fig. 7); no pollen basket developed on the hind leg. Abdominal sternites with very sparse long hairs beneath, which are not of the beautifully plumose structure of those forming the ventral scopa in the former group. Hind tibiae viewed from the side with the fringe along the upper margin much less dense, and the hairs more setose or subspinose, not with conspicuous lateral branches (or plumose) under a lens as in *H. perpessicius* and its allies. Fifth tergite distinctly angulate in the middle of its apical margin, the rima smooth, only with exceedingly fine reticulation under high powers of the microscope, carinated down the middle, where the surface is unsculptured and glabrous even under the strongest lens (Text-fig. 8).

Genotype: *H. extraordinarius* Kohl.

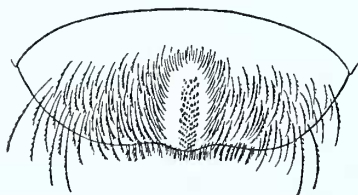
Since the ♂ of *E. extraordinarius* is not known to us, we can only mention the peculiar characters of *E. latro*, as compared with the *H. perpessicius* group. Compared with this, *Echthralictus* has a much broader face, with wider supraclypeal plate, and clothed with shorter, sparser pubescence, as also is the thorax, even the mesopleura and sternum being, comparatively speaking, inconspicuously clothed. The lateral pronotal angles are more prominent and very conspicuous; the propodeum viewed from in front is remarkably long, with very clear longitudinal wrinkles, and, except for the minute surface sculpture, is widely smooth for a considerable space before the brow. The abdominal sternites have a very short pubescence compared with the conspicuous hairs of *H. perpessicius*, as is easily seen in lateral aspect. The legs also are very different in their clothing, for, if the femora be viewed laterally, in the species just named and its allies, these bear a long hair fringe on the lower side, but in *Echthralictus* the fringe consists of extremely short hairs (Text-fig. 9).

6. *Halictus perpessicius* Kohl. (Text-figs. 3, 6 B, 7 B, 9 B.)

Denkschr. K. Akad. Wiss. Wien, Math.-Naturw. Kl., 81, p. 307, 1908.

As Kohl has pointed out, the ♂ differs considerably from the ♀ in the shape of head, the eyes being much more convergent beneath. In general the sculpture is similar, but in many males the mesonotal punctures are much less distinct. In this sex not only the coxae and trochanters, but also the femora, at least on the hind legs, may be almost entirely dark and metallic as an extreme variation.

The females from Tutuila examined by us have the abdomen of a much more blue-green or bluish metallic colour than the more brassy-coloured examples from Upolu, and the abdomen and propodeum are sometimes altogether blue. The legs in the Upolu females as a rule have at most the coxae more or less dark and metallic, but in Tutuila examples the trochanters also are often metallic and dark coloured. There is much variation in the sculpture of the anterior area of the propodeum, the wrinkles being sometimes simply longitudinal and



TEXT-FIG. 3.—Fifth tergite of *Halictus perpessicius* Kohl, ♂.

oblique on either side of the median raised line, and often more or less largely transverse on the apical portion; but sometimes a large part in the middle is conspicuously reticulate. As in the allied species, the upper part of the mesopleura bears a fine longitudinal rugulosity or striation, easily seen with a strong lens when viewed in a favourable position, while beneath this the

similar sculpture is transverse and continues on to the mesosternum.

About 100 examples of this species have been examined, only about one-fifth of which are females.

Tutuila, Upolu, and Savaii Is. (but only males from the latter seen). It appears to be generally distributed, the specimens examined being four or five times as many as those of all the other Halictine species together.

7. *Halictus upoluensis*, sp. n.

This species is so similar in its general characters to *H. perpessicius* and *H. samoae*, that a detailed description is hardly necessary. The material collected is quite insufficient for a proper understanding of the variation, which would appear to be possibly of a very interesting character. The new species is distinctly smaller than its allies, the ♀ being about 6 mm. long.

From *H. samoae* it is at once separated by the entirely different (broad) shape of the face, but some of the few examples seen approach very near to *H. perpessicius* in this respect, while others have the face broader and the supra-clypeal plate evidently shorter in comparison with the length. The surface sculpture of the mesonotum and scutellum is very dense, and the surface uniformly dull, while in *H. perpessicius*, usually at least, some part of the scutellum appears distinctly less dull or even quite shining. The femora of

all the legs are, except at the tips, dark and metallic, not clear rufotestaceous as in the larger species. Four of the females examined by us are from Malololelei, Upolu, and in these specimens the tergites are sub-metallic black, but the 4th tergite is conspicuously more metallic than the others. Except for some apparent difference in the width of the face, the specimens are very similar and this may be looked on as the typical form, differing greatly in the abdominal colour from *H. perpessicius*. A single ♀ from Salailua, Savaii, has the abdomen still less metallic and the mesonotum of a fine blue (not green) colour, while the tibiae and tarsi are mostly dark brown (not clear rufotestaceous). This may be called var. *savaiiensis*, var. n. A single specimen from Pago Pago, Tutuila, resembles the type in the colour of the legs and thorax, but the tergites are brilliantly metallic (brassy), as in *H. perpessicius*, wherein they resemble examples of the latter from Upolu rather than the Tutuila specimens, in which the abdomen is or tends to be blue in colour. The supraclypeal plate in this specimen is distinctly wider than in *H. perpessicius*, but not more so than in some typical individuals of *H. upoluensis*, in which there is evidently noticeable variation. This form may be called var. *tutuila*, var. n.

Except for a mutilated and doubtful example from Savaii, there are only two specimens of the ♂, both from Upolu, and these differ from the other sex in the same manner as do ♂ and ♀ of *H. perpessicius* one from the other, so that probably *H. upoluensis* will be found to vary as greatly as the other species. From this the colour of the hind tibiae (which sometimes, with the exception of the tips, are entirely darkened, or at least are infuscated above, as also are the hind tarsi), the smaller size, and generally the duller scutellum, will easily separate these two males. The ♂ genital armature is very similar, but the lacinia is shorter and wider than in *H. perpessicius*, though of the same simple form.

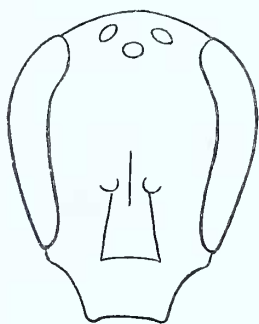
Upolu: Malololelei, 2000 ft., ii, iii, iv, 1 ♂, 3 ♀ (Buxton and Hopkins), i, 1 ♀ (Armstrong); Vailima, vi, 1 ♂ (Buxton and Hopkins). Tutuila: Pago Pago, xi, 1 ♀ (Buxton and Hopkins). Savaii: Fagamalo, viii, 1 ♂, much mutilated (Buxton and Hopkins); Salailua, v, 1 ♀ (Bryan). All the specimens were captured singly.

8. *Halictus samoae*, sp. n. (Text-fig. 4.)

♀. Head dark bluish-green inclining to black, clypeus and the plate above it more brassy; mesonotum and scutellum green, sometimes suffused with v. 1.

reddish, propodeum dark blue. Abdomen with distinct green metallic lustre, but not so strongly metallic as that of *H. perpersicius*. Coxae and femora dark and metallic, tips of latter more or less red or yellowish, rest of legs paler, tibiae and tarsi more or less brown, front tibiae, and sometimes the middle ones, pale anteriorly. In specimens with the abdomen or other parts more or less brown or pallid (from fixed immaturity*) the legs are altogether paler than in dark-bodied examples. Antennae dark brown or blackish-fuscous.

Face narrow and very long (Text-fig. 4), thinly clothed with pale, yellowish hairs, the length from the front margin of the anterior ocellus to the apical margin of the clypeus being greater than the width across the eyes. Clypeus



TEXT-FIG. 4. — Head of
Halictus samoae Perkins
and Cheesman, sp. n., ♀.

dark and shining on the apical part, elsewhere the microscopic surface sculpture is dense and evident, and there are rather numerous, but not at all dense, punctures; the supraclypeal plate is long and very sparsely and minutely punctured, the punctures much finer than those on the clypeus. As in *H. perpersicius*, the whole face has a dense reticulate sculpture under the microscope (appearing granulate under a strong simple lens), and the surface is consequently dull; the sculpture is densest over the middle of the face, between the ocelli and the line of insertion of the antennae, where there are more or less numerous,

very feebly impressed punctures; between the sides of the supraclypeal plate and the dark glabrous areas, and along the inner orbits, similar feeble punctures can easily be seen, but are very sparse; on the vertex the transverse striation is very distinct, as also is that on the sides of the head behind the eyes. Pronotum with the lateral angles prominent and distinct, the mesonotum with short erect hairs, less conspicuous than those on the pleura, the whole surface with microscopic reticulate sculpture, dull or hardly at all shining, densely, evenly and shallowly punctured; scutellum distinctly shining, and distinctly but irregularly punctured, the punctures all fine but of different sizes, the smaller extremely fine and more numerous than the others. Anterior area of the propodeum long, longer than the scutellum or subequal to this and the postscutellum; viewed from in front, the longitudinal wrinkles (which are

* In the tropics, in the case of certain species of bees, individuals often preserve throughout life the appearance characteristic of immature examples.

not coarse) extend back to the brow; the rugosity is also to a large extent reticulated; the lateral areas are finely striated or rugulose, and have no raised margins; the posterior face is clothed with some erect plumose hairs, and also some appressed and minute pubescence, and has only microscopic surface sculpture; the mesopleurae are closely and very finely, transversely rugulose or striated, and this sculpture is continued on to the mesosternum.

Wings hyaline, slightly brownish tinged, clearer in subimmature examples; stigma and much of the neuration dark brown or nearly black. Viewed from the side, the fringe above the tibiae and first tarsal segments consists of dark or sordid hairs; on the inner side of these parts on the hind legs, the hairs are golden.

Abdomen black and submetallic with the tergites apically sometimes reddish, or with the basal segments, as also more or less of the propodeum, yellowish-brown, as if from immaturity; it is quite shining in spite of the surface sculpture, which consists everywhere of a very fine transverse rugulosity or striation, distinctly visible under a strong lens; the basal tergite is impunctate, the second sometimes with some indication of obsolete punctures; on the third, and still more on the fourth tergite, ill-defined piliferous punctures are evident; the apical impressions are all very distinct, with definite transverse striation, but without punctures. Viewed from above, the abdominal pubescence is hardly noticeable except towards the sides and about the apex, while the hairs around the *rima* are pale greyish-brown or yellowish. The extremely long plumose hairs of the ventral scopa on the first to fourth sternites are of a dull yellow or ochraceous colour, similar to that of the dense scopal hairs developed on the pleurites. Length, ♀, about 7 mm.

Upolu: Malololelei, 1 ♀, 24.ii.1924 (Buxton and Hopkins); 1 ♀, 24.vi.1924 (Armstrong); 1 ♀, vii.1925 (Wilder). All three examples had suffered in manipulation, and from breakage, etc., but after cleaning and repairing are fairly satisfactory as specimens. The individual collected by Armstrong, which is darkest in colour, and less immature in appearance, has been selected as the type.

9. (?) *Halictus stvensoni* Cockerell.

Ann. Ent. Soc. Amer., 17, p. 394, 1924.

Whether this insect belongs to the *perpessicius* group or to *Echthralictus* cannot be determined, since the original description makes no mention of the vestiture of either head, thorax, abdominal sternites or legs, nor even of the

puncturation of the mesonotum and scutellum. In colour it must greatly resemble *E. latro*, and we fear that possibly the latter name may have to be treated as a synonym; yet since the clypeus is said to be "highly polished without evident punctures," while in *E. latro* this part, as seen under a rather strong lens, is quite distinctly sculptured, and likewise has sparse but quite evident punctures, one would hardly be justified in considering the two to belong to the same species.

Upolu: Apia. We know this species only from Prof. Cockerell's very brief description.

Halictus tonganus, sp. n.

Aeneous, the abdomen more nearly black, much less metallic than the thorax, but becoming more so towards the apex, so that the 5th tergite, excepting its apical impression, is much more distinctly brassy than the basal ones. Antennae with the flagellum rufescent beneath; legs aeneous black, apices of femora, the tibiae and tarsi rufotestaceous. Wings clear hyaline, costa and subcosta nearly black, stigma dark brown.

Face wider than in *H. perpersicius*; when viewed from in front it is nearly circular, being just about as broad across the eyes as long, and distinctly wider than the length from the front margin of the anterior ocellus to the apical margin of the clypeus. In sculpture, clothing, shape, etc., the face is very similar to that of typical *H. upoluensis*, but the front between the ocelli and antennae is finely striated longitudinally, though not without reticulation.

Mesonotum dull owing to the dense surface sculpture, very remotely and finely, but distinctly punctured, more remotely on all the middle part than along the lateral and posterior margins; tegulae testaceous; scutellum strongly shining in contrast with the mesonotum, finely and irregularly punctured; anterior area of the propodeum somewhat shining, reticulate-rugose, but the wrinkles more longitudinal towards the sides, and apically in the middle transverse (as is often the case in *H. perpersicius*, but probably the details are variable); the lateral areas in some aspects have a fine longitudinal rugosity continued from that of the anterior area, while the lateral raised margins of the posterior (vertical) face reach upwards to the hind end of the lateral areas; above the insertion of the abdomen there is evident transverse rugosity.

Abdomen moderately shining, the transverse microscopic sculpture of 1st tergite only just evident under a very strong lens, the following segments with

excessively minute, sparse, ill-defined, piliferous punctures amongst the transverse surface sculpture; the apical impressions have a similar sculpture, but are without punctures, and the hairs which spring from their base are short and even on the 5th tergite only attain the apical margin towards the sides of the segment, forming a thin row or fringe above the impression. Ventral scopa as in the Samoan species. Length, 6 mm.

Tonga: Nukualofa, 1 ♀, 23.ii.1925 (Hopkins).

Halictus fijiensis, sp. n.

♂. Aeneous, and resembling a very small *H. perpessicius* in most respects, but rather smaller than the most depauperated individuals of that species. Compared with the latter, the face is wider and, though the punctuation is very similar, the sculpture of the front between the antennae and ocelli is very different, exhibiting evident longitudinal striation. Antennae black or blackish fuscous.

Mesonotum somewhat shining in spite of the surface sculpture, and with sparse and very feeble punctures, the scutellum brightly shining or polished, surface sculpture being visible only under the strongest lens, and with very few, indistinct punctures. Anterior area of propodeum on either side of median carina with obliquely longitudinal wrinkles, continued as fine rugulosity over the lateral areas, so as to resemble *H. perpessicius* in these features, but the raised lines at the sides of the posterior face are continued up to the lateral areas, and there are rather strong transverse wrinkles above the abdominal insertion. Abdomen very like that of most Upolu specimens of *H. perpessicius*, but the apical impression of 1st tergite is wanting, or only defined at the sides and this tergite is more shining; the general sculpture is like that of the Samoan species, but the erect hairs of the sternites are evidently shorter. Legs dark, aeneous black, tibiae and tarsi testaceous, but the middle and hind tibiae are largely dark, pale at base and apex.

The genital armature is very distinct from that of the Samoan species, but shows characters indicating relationship. Length, 5-5.5 mm.

The ♀ is very like the ♂, the finely, longitudinally striated frons and transverse wrinkles of the lower part of the posterior face of the propodeum distinguish it at once from the larger *H. perpessicius*, which has a longer face with thinner temples.

From *H. tonganus*, the more or less shining surface of the head and mesonotum, the very fine punctures of the latter being ill-defined and obsolete, will

easily separate the present species. The sculpture of the propodeum resembles that of the Tongan species, but is quite likely to vary in both, since it is very unstable in details in *H. perpessicius*. The black and subspiniform hairs, which are found amongst the pale and more plumose ones of the upper edge of the hind tibiae, and on the outer side of these, appear to be distributed over the whole of this side in *H. fijiensis*, but only over a part in *H. tonganus*.

Fiji: probably common. I have seen specimens collected many years ago by Koebele and by myself, and I think others still earlier by Hamilton and Weiske, but the specimens have mostly been dispersed (Perkins).

Fiji: Cuvu, 5 ♂♂, 6 ♀♀, 24, 25.vi.1915 (Veitch); Suva, 1 ♀, 22.ix.1920; Yasawa, 1 ♂, 14.x.1921; Ovalau, 1 ♂, 21.x.1921; Taviuni, 1 ♀, 19.xii.1921 (Simmonds) (in coll. Brit. Mus.).

Halictus versifrons, sp. n.

A single ♂ specimen, obtained with *H. fijiensis*, though resembling the latter in many respects, appears to represent a distinct species.

♂. Head and propodeum aeneous, but the mesonotum and scutellum more purplish metallic or coppery, the abdomen shining blackish brown and metallic, the apices of the femora, tibiae and tarsi testaceous, with the middle and hind tibiae subinfusate, except at the base and apex; extreme base of the scape of the antennae yellowish.

The front of the head is not longitudinally striated, but under a strong lens, in favourable aspect, the surface sculpture appears transverse or as transverse striation, though there is much microscopic reticulation; the sides of the head behind the eyes, and the face adjoining the lateral margins of the clypeus, have the usual longitudinal sculpture. Mesonotum dull, the punctures remote and very minute and feeble. Propodeum finely reticulate-rugose, the surface within the reticulations minutely sculptured; on the lateral areas, and on the brow of the posterior declivous surface, the sculpture appears minutely granulate under a strong lens; transverse wrinkles above the insertion of the abdomen not (or hardly) noticeable. Tergite 7 with its dorsal area yellowish, and truncate at the apex. (Since the form and colour of this part vary more or less in Samoan species, they are likely to do so in this one.)

The single specimen appears to be rather smaller than the smallest ♂ *H. fijiensis*, but in general resembles that species, so that a more detailed description

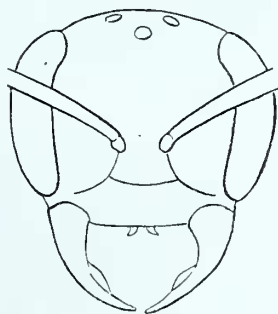
seems unnecessary. The calcar of the hind tibiae is armed as in *H. fijiensis* and the Samoan species.

Fiji: a single ♂, i.1905.

10. *Echthralictus latro*, sp. n. (Text-fig. 5.)

♀. Metallic blue, scutellum more greenish, head and abdomen blue black, mandibles for the most part and legs more or less clear testaceous, front and hind coxae largely dark and metallic.

Head wide, wider than the thorax including the tegulae; seen from above, narrowed behind the eyes, but temples large; face transverse, sparsely clothed with pale hairs, which are longer and more conspicuous beneath than above the antennae; clypeus somewhat shining compared with the parts above, but under a strong lens evidently sculptured and appearing granulate, less distinctly so towards the apex, which is straightly truncate, with a thin fringe of long and very fine golden setae, very remotely and finely punctured, the punctures bearing fine setae, the surface somewhat depressed or flattened except on the duller basal part. Frontal portion of the head very densely reticulately sculptured under the microscope (appearing minutely granular under a lens), sculpture appearing densest and with numerous feebly impressed punctures over the median portion where pubescence is very short; beneath antennae, and along inner orbits above, punctures are very sparse; transverse striation of vertex behind ocelli very fine. Antennae black or blackish fuscous, flagellum slightly paler beneath.



TEXT-FIG. 5. — Head of *Echthralictus latro* Perkins and Cheesman, sp. n., ♀.

Mesonotum with microscopic reticulate sculpture, but appearing less dull behind, punctures fine, shallow and remote, but quite distinct; scutellum with very fine, but distinct, sparse punctures, unequal in size, the surface evidently shining (duller posteriorly) though microscopically reticulated all over; tegulae more or less testaceous; postscutellum subrugose; propodeum with anterior area somewhat concave, very regularly and clearly rugose longitudinally; viewed from in front, the rugae do not reach the brow, which appears more or less shining (strongly so in some aspects), though the surface is reticulated; lateral areas undefined and duller, reticulated microscopically and with very fine longitudinal wrinkles apparent in some aspects; posterior face with the lateral margins

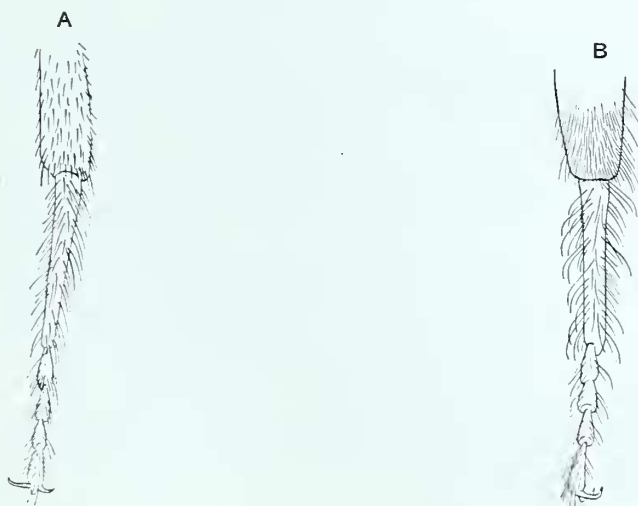
defined by a raised line, extending up to the posterior angle of the lateral areas ; surface smooth, except for microscopic sculpture and some transverse rugae above the abdominal insertion ; mesopleura sparsely hairy ; above, beneath insertion of wings, longitudinally rugulose or striate, as is adjoining part of metapleura. Wings hyaline, very little infuscated ; neuration brown, costa, subcosta and stigma dark.

Abdomen hardly shining, very finely transversely rugulose or striate over its whole surface, very sparsely clothed ; 3rd tergite, as also 4th, with some sparse and ill-defined piliferous punctures ; apical impressions of all segments distinct (except that on basal segment in middle), and without punctures. The row of hairs springing from the base of the impressions on the 3rd and 4th tergites very sparse, remote one from another, and on the latter only a few appearing to reach actual hind-margin. Length probably $5\frac{1}{2}$ –6 mm. (Owing to the position of head and abdomen in the unique specimen, measurement is difficult.)

The ♂ differs from the ♀ described above much as does the ♂ of *H. perpessicius* from the other sex, the eyes being notably convergent to the apex when the head is viewed from in front.

The clypeus is more or less shining compared with the upper parts of the face, but under a lens the surface is seen to be evidently sculptured in the usual manner. In general, the blue colour is brighter than in the ♀, the thorax somewhat shining, the mesonotum with fine, shallow and very remote, but distinct, punctures, those of the scutellum rather variable, being notably more numerous in some examples than in others, as is the case with *H. perpessicius*. The hind femora are for the most part dark and metallic, the front and middle ones often so in a lesser degree or only beneath, the hind and middle tibiae are brown or infusate, at least on the upper side. Abdominal tergites blue-black or purplish-black, with sparse fine hairs, chiefly noticeable on the more apical segments, the pleurites with sparse short hairs, the sternites also with short erect clothing as seen in lateral view. The 7th tergite has the sides and apex sharply margined as in the other Samoan species, the apex usually slightly emarginate, the colour often reddish. The genital armature is in general like that of *H. perpessicius*, but sufficiently distinct.

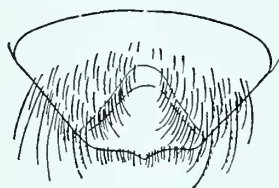
Savaii: Salailua, 1 ♀, 22.v.1924 (Bryan). Upolu: Vaea, 1100 ft., 1 ♂, 25.iv.1924 (Bryan) ; Leulumoega, about half a dozen of this sex, 14.ix.1923 (Swezey and Wilder).



TEXT-FIG. 6.—Anterior tarsus of ♀ of (A) *Echthralictus extraordinarius* Kohl, and (B) *Halictus perpessicius* Kohl.



TEXT-FIG. 7.—Posterior femur of ♀ of (A) *Echthralictus extraordinarius* Kohl, and (B) *Halictus perpessicius* Kohl.



TEXT-FIG. 8.—Fifth tergite of *Echthralictus extraordinarius* Kohl, ♀.



TEXT-FIG. 9.—Posterior femur and trochanter of ♂ of (A) *Echthralictus latro* Perkins and Cheesman, sp. n., and (B) *Halictus perpessicius* Kohl.

11. *Echthralictus extraordinarius* Kohl. (Text-figs. 6, 7, 8.)

Haliectus extraordinarius Kohl, *Denkschr. K. Akad. Wiss. Wien, Math.-Naturw. Kl.*, 81, p. 306, 1908.

This fine species does not appear to be common, as we have seen only about half a dozen examples and unfortunately all are females, so that it has not been possible to examine the male characters. The thoracic punctuation and sculpture generally are almost as in *E. latro*, but though the head of the latter is very wide it is less incrassate than in Kohl's species, which has the sides behind the compound eyes much wider. The similar clothing and form of the legs, and the form and clothing of the 5th tergite show an evident relationship between the two species, but the great difference in the mandibular structure is very remarkable.

Upolu: Vailima, 12.xii.1925, 1 ♀, and Apia, ii.1924, 1 ♀ (Buxton and Hopkins); Vaea, 1100 ft., 25.iv.1924, 1 ♀ (Bryan); Apia, 12, 13.ix.1923, 2 ♀; Leulumoega, 14.ix.1923, 2 ♀ (Swezey and Wilder).

SPHECOIDEA.

TRYPOXYLONIDAE.

12. *Pison glabrum* Kohl.

Denk. K. Akad. Wiss. Wien, Math.-Naturw. Kl., 81, p. 309, 1908 (Samoa), ♀.

♂. Distance between posterior ocelli over half that between the latter and the eyes; (5 : 8) interocular space on widest part of frons 100; on narrowest part of vertex 40. Antennal segments, 1st to 4th, 8 : 22 : 24 : 22.

♀. Distance between posterior ocelli three times that between the latter and the eyes (6 : 2); interocular space on widest part of frons 100; on narrowest part of vertex 30. Antennal segments, 1st to 4th, 10 : 25 : 25 : 24 (62 = 1 mm.).

Samoa (? Apia): 2 ♀♀, 1913 (Doane); Upolu, 1 ♂, 1 ♀, 16.ix.1923; Savaii, 1 ♀, 5.i.1924 (Swezey and Wilder).

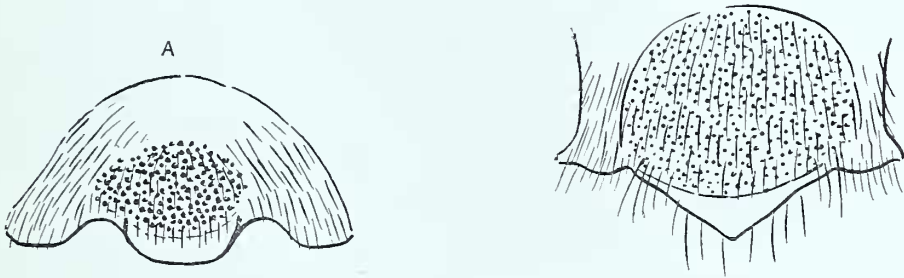
13. *Pison tahitense* Sauss. (Text-fig. 10, A.)

Saussure, *Reise Novara Zool.*, ii, pt. 1, p. 65, 1867 (Tahiti) (Syn. *P. rechingeri* Kohl, *loc. cit.* p. 309).

In 1908 Kohl (*loc. cit.*) recorded three species of *Pison* from Samoa, namely, *P. tahitense* Sauss., represented by a single ♀, and two new species, *P. glabrum*

and *P. rechingeri*. The description of the last agrees perfectly with *P. tahitense* Sauss., and the most probable explanation appears to be that Kohl was unfamiliar with *P. hospes* Sm. and assigned his solitary specimen of that species to *P. tahitense*, to which it is closely allied, and described his specimens of *P. tahitense* under the name *P. rechingeri*.

We have not seen the type of *P. tahitense* but, although the majority of characters in Saussure's description might apply equally to either species, the clypeal characters, "clypeus sub-convexus, medio margine arcuato-producto et



TEXT-FIG. 10.—Clypeus of (A) *Pison tahitense* Sauss., ♀, and (B) *Pison hospes* Sm., ♀.

foveolato," make it sufficiently clear which species he had before him. In *P. hospes* Sm., the clypeal margin is angularly produced in both sexes (Text-fig. 10).

Further differentiating characters are: Abdomen much more shining than in *P. hospes*; silvery pubescence, when present, much shorter and sparser on the discs of the tergites, forming an apical band on the 1st tergite, and fasciae on the lateral parts of the apical impression of the 2nd, but hardly noticeable on the 3rd and 4th tergites. Frons with a short but distinct median sulcus.

Savaii, 5 ♂♂, 9 ♀♀, 5.xii.1924 (Bryan); Tutuila, 2 ♀♀, 9.vi.1923 (Swezey and Wilder); Upolu, 2000 ft.: 1 ♂, 4 ♀♀, 12.iii., 4.v., and vi. and viii.1924.

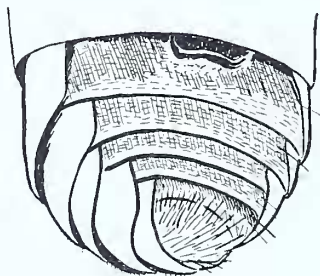
14. *Pison hospes* Sm. (Text-fig. 10, B.)

Sm. *Journ. Linn. Soc. Zool.*, xiv, p. 676, 1879.

Tutuila, 3 ♀♀, iv.1918 (Kellers); 1 ♂, 2 ♀♀, 10, 22.ix.1923 (Swezey and Wilder); 1 ♀, 4.xi.1925 (Buxton and Hopkins); Upolu: 3 ♀♀, 1913 (Doane); 1 ♀, 13.ix.1923 (Swezey and Wilder); 1 ♀, vi. (Buxton and Hopkins); 3 ♀♀, 1 ♂, 12.v.1924, 1 ♀, lower forest, 1000–2000 ft. (Bryan).

15. *Pison argentatum* Sh., sub-sp. *ignavum* Turn.Turner, *Proc. Zool. Soc. Lond.*, p. 511, 1908.

Upolu : 1 ♂, 1 ♀, 19.x.1922 and 5.i.1924 (Armstrong) ; 3 ♀♀, 1913 (Doane) ; 15 ♀♀, i.-vi.1924.

16. *Pison iridipennis* Sm. (Text-fig. 11.)Smith, *Journ. Linn. Soc. Zool.*, xiv, p. 676, 1879.

TEXT-FIG. 11.—*Pison iridipennis* Sm., ventral aspect of abdomen of ♂, showing tubercle on 3rd sternite.

P. iridipennis may be distinguished from any other known species of *Pison* by the presence of a small tubercle (sometimes withdrawn basally) on the third sternite in the ♂ (Text-fig. 11), also by the vestiture of the apical sternite and the genital armature.

Upolu : 2 ♂♂, 2 ♀, 19.ii., 1.x.1923 (Armstrong) ; 2 ♀♀, v., x.1924 (Buxton and Hopkins) ; Tutuila : 1 ♀, xii.1917 (Kellers).

MIMESIDAE.

17. *Psen bryani*, sp. n.

Black, tarsi largely testaceous in female, but hind ones in male nearly black ; calcaria pallid.

Face densely clothed with silvery hairs beneath antennae, much silvery hair also above them in the middle of the front ; apical margin of clypeus narrowly bare, and with a very slight, median emargination or sulcus ; frons near anterior ocellus very finely punctate, punctures on vertex larger and very remote. Viewed from above, the interantennal process exhibits a small, bare, median tubercle amongst the silvery hair. Antennae more slender in ♂ than in ♀, third joint $2\frac{1}{2}$ –3 times as long as wide and much longer than fourth, but shorter than 4th and 5th together.

Pronotum posteriorly along the margin with a transverse line of silvery pubescence ; mesonotum shining, copiously but not densely punctured, the punctures somewhat unequal in size ; scutellum remotely punctured, its anterior

transverse impression consute; mesopleura, like sides of head of propodeum, well clothed with white or silvery hairs, very finely and not densely punctured; anterior area of propodeum with strong, widely separated, longitudinal wrinkles or costae, the spaces between which are smooth and shining; remainder of propodeal surface clothed with white or silvery hairs (directed in different ways), more or less widely reticulated or areolated, and finely sculptured in the spaces between the raised lines. Wings hyaline, costa, subcosta, and stigma dark brown, second cubital cell evidently longer than wide, receiving 1st recurrent near or rather before middle, 2nd just before 2nd transverse cubitus, 3rd transverse cubitus strongly indented or subangulate about middle. Middle tibiae of ♀ with two antepical spines on upper margin, hind tibiae with about a dozen along same margin.

Abdomen with simple petiole, subconvex, smooth and shining above, about $1\frac{1}{2}$ times as long as postpetiolar part of the segment, with a thin fringe of outstanding pale hairs on each side; 3rd and following tergites bearing very remote, feeble, piliferous punctures of unequal size, with the surface between them microscopically sculptured, just perceptibly so under a strong simple lens; 2nd tergite finely and sparsely punctured, more numerous and clearly in the ♀, in which at the base the punctures are copious but minute, much closer than those on the rest of the tergite. Pygidial area of ♀ smooth and very narrow, nearly twice as long as its basal width, with well-raised lateral keels, just within which is a row of a few punctures along each side, each puncture bearing a very short hair, much shorter than the sparse ones on the sides of the segment outside the area; 2nd sternite strongly convex, polished and nearly impunctate for a large part, but duller and more punctured at sides; following segments with microscopic sculpture, evident under a strong lens; 6th segment minutely and copiously punctured, with a few coarser punctures interspersed and a smooth median carina on its apical half. ♂ with 3rd and 4th sternites furnished along their apical margins on either side of the middle line (but occupying only about $\frac{1}{3}$ the whole width of the segment) with special erect hairs (in the specimen examined, these hairs are largely agglutinated together into pencils, but it is possible that in clean specimens they form a broken line of erect and separate cilia); 6th sternite punctured and clothed with dense short hairs, its side-margins with extremely short, closely set spinules, which are visible on each side at the apex of the abdomen, when this is viewed from above. Length, about 12 mm.

Tutuila : Pago Pago 1 ♀ (selected as the type of the species), 18.iv.1924 (Bryan). Savaii : Safune, rain forest, 2000–4000 ft , 1 ♂, 2.v.1924 (Bryan).*

VESPOIDEA.

VESPIDAE.

18. *Polistes macaënsis* Fab.

Fabricius, *Entom. Syst.*, ii, p. 259, 1793.

Upolu : 2 ♀♀, 14, 22.iv.1922 (Armstrong) ; 6 ♀♀, 9.xii.1923 (Swezey and Wilder) ; 1 ♂, 1 ♀, ii., vi.1924 (Buxton and Hopkins). Savaii : 3 ♀♀, 12.v.1924 (Bryan).

19. *Odynerus (Rhynchium) rufipes* Fab.

Fabricius, *Syst. Entom.*, p. 367, 1775.

Upolu : 7 ♂♂, 3 ♀♀, ix.1923 (Swezey and Wilder) ; 1 ♂, 5 ♀♀, ii.–xi.1922 (Armstrong) ; 7 ♀♀, iii., vi.1924 (Buxton and Hopkins). Tutuila : 1 ♂, 4 ♀♀ iv.1918 (Kellers) ; 1 ♂, 6 ♀♀, ix.1923 (Swezey and Wilder).

20. *Odynerus (Leionotus) bicinctus* Fab.

Fabricius, *Spec. Ins.*, i, p. 465, 1781.

Upolu : 1 ♂, 7 ♀♀, ix.1923 (Wilder) ; 4 ♀♀, 12.x.1922, 5.i.1924 (Armstrong) : 7 ♀♀, ii.1924, ii.1925 (Buxton and Hopkins). Savaii : 33 ♀♀, v.1924 (Bryan). Tutuila : 1 ♀, no date (Kellers) ; 1 ♀, 4.xii.1924 (Bryan) ; 5 ♀♀, ix.1923 (Swezey and Wilder) ; 2 ♀♀, xi., xii.1925 (Buxton and Hopkins).

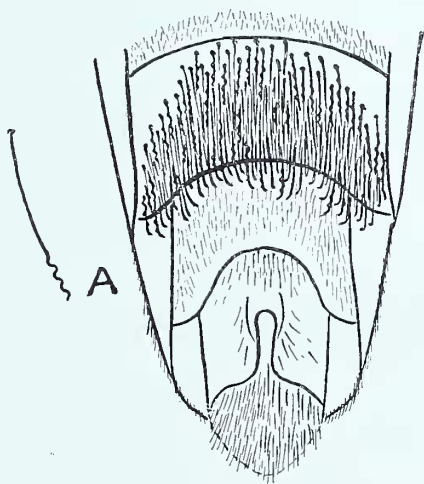
POMPILIDAE.

21. *Anoplius spirohirtus*, sp. n. (Text-fig. 12.)

♂. Black or blackish fuscous, with a slight purplish tinge in some cases ; head and most of upper parts of body with dense metallic green or golden green, squamous, appressed pubescence. Face beneath antennae, and base of mandibles

* On receipt of these specimens in London, the ♂ was found to be damaged in various ways, and its abdomen was lying loose in the box. It is possible that the form on Savaii may show racial or subspecific differences.

with dense, silvery, appressed pubescence, with exception of a median area on the clypeus; this pubescence continued along orbits as high as or a little higher than upper edge of antennal fossae. Fine, longish erect, black hairs conspicuous on face and vertex, as well as behind eyes and on propleura and under side of anterior coxae; the latter region also with appressed, silvery pile. Head viewed from beneath exhibiting two angular processes at base of cibarial apparatus; scape of antennae with dense, white or silvery hair beneath outwardly; width of 1st segment equal to half its length; 3rd and following segments hardly differing in length, generally about three times as long as broad. Mandibles with an ante apical tooth on their upper edge. Pronotum short, strongly transverse, posteriorly arcuately emarginate, or with hind margin at most very obscurely obtusely angulate in middle; seen from above, humeral angles appear rounded off. Propodeum with erect, fine hairs, and, as seen from above, with sides produced at about middle of their length into a blunt process or spine, at which point the width is greatest; length in dorsal aspect slightly greater than that of scutellum and postscutellum together, and about the same as that of mesonotum. Claws bifid, lower tooth much the shorter and blunt; shorter calcar of hind tibiae reaching to about middle of first tarsal segment when laid along this; inner calcar much longer, more than three-fourths as long as first tarsal segment; hind tibiae and first segment of hind tarsi with the spines well developed for the ♂ sex. Third cubital cell of fore wing subtriangular or subpetiolate; hind wings with median and submedian cells equal (measured on median nervure). Abdomen with 2nd and 3rd sternites with sparse erect hairs, in addition to minute decumbent clothing, and very finely punctured; 4th, except at base and sides, subdepressed and flattened, and densely clothed with black kinky hair; 5th, flat and deeply arcuately emarginate, clothed with sparse erect hairs; apical sternite subcompressed so as to appear somewhat carinate in middle, in some aspects at least, and densely hairy (Text-fig. 12).



TEXT-FIG. 12.—Ventral surface of abdomen of *Anoplius spirohirtus* Perkins and Cheesman, sp. n., ♂; A, a hair from 4th sternite somewhat more enlarged.

In one specimen (22.v.1924) the silvery white pubescence is absent on the face and antennal scape.

♀. Pubescence entirely golden-green, silvery pubescence absent.

Interocular space on vertex narrower. Antennae: width of 1st segment slightly exceeding two-thirds of its length; 3rd segment longer than the two following (length of 3rd to 5th segments 50, 42, 28). Sides of propodeum produced in middle of their length, but not forming a blunt process. Abdomen with 5th tergite furnished with long stout, black bristles, denser at apex. Two bristles in centre of 2nd, 3rd, and 4th sternites, and a few scattered over surface of 5th sternite. Claws simple. A short, well-developed spine upon apical third of 2nd, 3rd, and 4th segments of posterior tarsi.

Upolu: Malololelei, 1 ♂, 10.vi.1924 (Armstrong, type). Savaii: Salailua, 4 ♂♂, 22.v.1924; Safune, 1 ♂, 15.v.1924; 1 ♂, 1 ♀, lowlands, 1000 ft., 15.v.1924; 3 ♂♂, rain forest, 2000-4000 ft. 3, 4.v.1924 (Bryan).

LIST OF TEXT-FIGURES.

- Text-fig. 1. Genitalia of *Megachile*, spp. ♂:—*M. diligens* Sm.: A, Dorsal view; B, Profile (stipes). *M. scutellata* Sm.: C, Dorsal view; D, Profile (stipes).
- „ 2. A, Posterior tarsus of *Lithurgus (Megachile) bractipes* Perkins and Cheesman, sp. n.; B, Posterior tarsus of *L. (M.) atratiformis* Sm.
- „ 3. Fifth tergite of *Halictus perpessicius* Kohl, ♂.
- „ 4. Head of *Halictus samoae* Perkins and Cheesman, sp. n., ♀.
- „ 5. Head of *Echthralictus latro* Perkins and Cheesman, sp. n., ♀.
- „ 6. Anterior tarsus of female of (A) *Echthralictus extraordinarius* Kohl, and (B) *Halictus perpessicius* Kohl.
- „ 7. Posterior femur of (A) *Echthralictus extraordinarius* Kohl, ♀, and (B) *Halictus perpessicius* Kohl, ♀.
- „ 8. Fifth tergite of *Echthralictus extraordinarius* Kohl, ♀.
- „ 9. Posterior femur and trochanter of male of (A) *Echthralictus latro* Perkins and Cheesman, sp. n., and (B) *Halictus perpessicius* Kohl.
- „ 10. Clypeus of (A) *Pison tahitense* Sauss., ♀, and (B) *Pison hospes* Sm., ♀.
- „ 11. *Pison iridipennis* Sm., ventral aspect of abdomen of ♂, showing tubercle on 3rd sternite.
- „ 12. Ventral surface of abdomen of *Anoplius spirohirtus* Perkins and Cheesman, sp. n., ♂; A, a hair from 4th sternite somewhat more enlarged.